Fire Sprinkler Trade-Ups Offer Advantages to Developers, Homeowners and Communities

Excerpts from the NFSA Fire Sprinkler Guide 2000 Edition

Fire sprinkler advantages are, in reality, construction design options permitted when fire sprinklers are provided in the building. These advantages have been referred to as trade-ups, design options and other miscellaneous terms, which sometimes create an illusion of giving up the requirement for something less effective. In all cases, sprinkler advantages provide increased fire safety over the protection that was provided originally in the code. By implementing trade-ups and design options with automatic fire sprinkler protection, fire safety can be increased and municipal operating costs can be controlled while providing economic and design incentives to developers to lower construction costs.

The best time to promote the trade-up concept for subdivision development savings is prior to submitting subdivision plans. Local authorities should review and modify all overly restrictive development and construction requirements to make sprinkler protection economically feasible. When proper subdivision and development options are provided, development cost can be reduced. The possibility of lower-cost lots can encourage fire sprinkler installations. Sprinklered developments give an excellent opportunity to provide increased fire safety without burdening the municipality with ever-increasing expenses in fire department staffing.

Fire sprinkler advantages provided by the building code should be applied in the original design. Trying to apply the advantages following final plan preparation usually results in increased architectural fees and may not provide the overall design advantages and savings in construction costs.

The cost of developing raw land into an approved building site presents a number of options for developments protected by automatic fire sprinklers. These options are only applicable if all the buildings in the development will have built-in automatic fire protection. These options include:

Street Width Reduction: Street widths may be reduced. Quick access to the building by larger pieces of fire equipment is unnecessary so traffic lanes may be reduced from twelve feet to ten feet, a savings of at least four sq. ft. of pavement of every linear foot of street in the development. Saving in stormwater requirements and road maintenance.

Longer Dead-End Streets: Dead-end streets may increase in length from 200 to 500 ft. Additional building lots may be accessed.

Tee Turnarounds Permitted: 80 to 100-foot diameter cul-de-sacs are normally required to permit rapid turnarounds of larger fire vehicles in developments. The permitted use of tee turnarounds in sprinklered developments can create at least one additional lot per cul- de-sac.

Increased Street Grades and Building Setbacks Permitted: Street grades over 10 to 12 degrees and building locations more than 250 feet from paved fire vehicles access may be permitted. This can increase the flexibility in land use and be extremely beneficial in residential subdivisions constructed in hilly terrain.

Additional Units Permitted: Although the actual percentage may vary, increases of up to 20 percent are not uncommon. The additional units spread the development cost over more units and reduce the cost per unit. This can mean substantial savings to the developer in reducing both the up-front costs, as well as the interest charges. Lower development costs per unit should mean lower selling prices per unit.

Expansion of Existing Water Supply May Not Be Needed: Required fire flows for fully sprinklered developments can be reduced by as much as 75 percent compared to non-sprinklered developments. This reduction could determine whether expensive upgrading of the existing water supply system would be required. Reductions are based on the size of the buildings and the type of construction used.

Increased Hydrant Spacing: Reduced fire flows also permit the use of smaller water supply mains and permit increased fire hydrant spacing. Supply mains may be reduced as much as two inches while hydrant spacing can increase from 250 feet to 1,000 feet. Smaller mains and fewer hydrants mean lower development costs.

Reductions in Water Connection Fees: Reductions through negotiation can result in lower tap fees or standby charges. Fire departments use far less water in developments with sprinklered buildings. Unrealistic tap fees and standby charges for fire sprinklered buildings must be eliminated wherever they occur. These charges have been used as a means to raise revenue without raising rates. Building owners should not be charged additional fees for providing a fire sprinkler system when they are also paying for the main and fire hydrants at the street.

New Fire Stations: When entire developments have sprinkler protection, developer contributions for the construction of a new fire station may be reduced or eliminated.

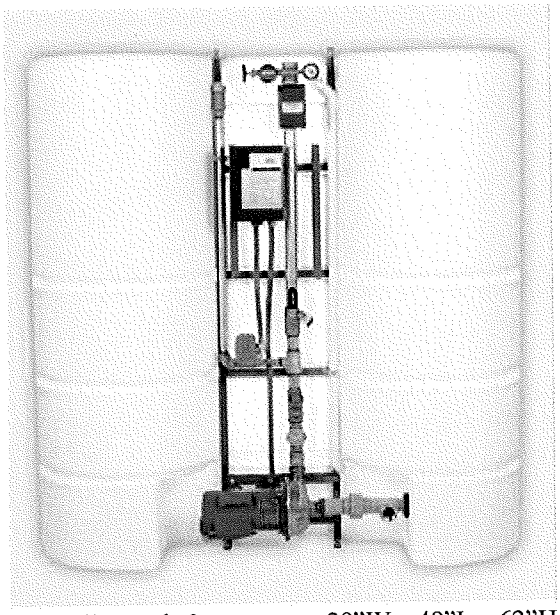
Decreased Death Rates and Property Loss: Over time, communities with fully sprinklered developments should see a decrease in fire death rates and property loss.

Scottsdale, Arizona has had an ordinance requiring fire sprinkler installation in all new construction for over 15 years. Today, more than half the homes in Scottsdale are protected by sprinklers. In addition to the benefits described above, a detailed history of the effects of the automatic sprinkler code in Scottsdale shows a significant difference in fire loss and water damage following fires that occurred in homes with fire sprinklers compared to homes without sprinkler protection. Most important, not a single person has died in homes with fire sprinklers.

Requiring all new construction to have fire sprinkler systems is a win-win decision. The community has additional fire protection without either higher taxes or increased insurance rates. The developer can reduce his land development costs. The builder can reduce his construction costs. And the buyer will have increased life and property protection at a lower cost.

Public Comment

This is to address one of the questions from the Council about in-fill lots and well systems with residential fire sprinkler systems. Residential sprinkler systems are designed to have a water supply with a minimum duration of 10 minutes. The average residential sprinkler system is designed to flow two sprinklers for 10 minutes minimum, thus needing an approximate 300 gallon water supply. A water utility company can provide this service for an average cost of $3,500. But in areas without water, what options are available.

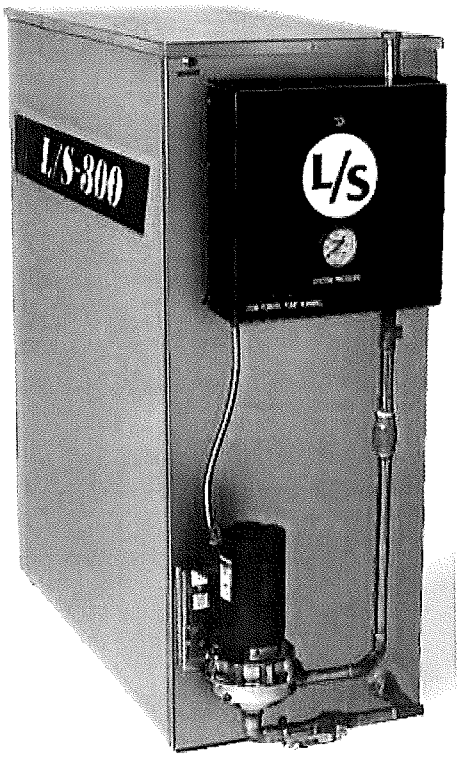


300 gallon tank & pump sys, 29"W x 49"L x 62"H

The most common solution is a pump and tank system, as shown in the above and below photos. This system is comprised of a tank, typically plastic, and a small pump suited to meet the sprinkler system design needs. The tanks have a float-fill system keeping the systems adequately filled once connected to the domestic system. These systems can be purchased as a package or separately to meet the consumer needs.

In comparing the costs of a pump and tank system versus those found in a home water utility system, pump and tank systems have an average cost of $3,400. Based on our research the cost difference of a residential sprinkler system served by a water utility versus a pump and tank is an average of $100 cheaper for the pump and tank and in some cases this systems could be much cheaper than the fees of the water utility department.

Additional benefits of the pump and tank systems are the systems are designed for space efficiency with small footprints. Some tanks are designed to fit thru doorways as small as 29" or can be installed in confined spaces as bolt-together tanks. Many of the pump and tank systems have options for use in areas without power, such as connection to solar power supplies or pneumatic design utilizing a pressurized nitrogen cylinder instead of a pump.



300 gallon tank & pump sys. 24"W x 60"L x 60"H

A Tale of Two Affiliates

Made in the Shade in Austin, Texas

by Catherine Lee Doar

Keeping homes cool and dry is the greatest challenge in Austin's hot and humid climate. We have always designed and oriented homes and chosen materials and systems to mitigate the effects of sun and moisture. Our affiliate frequently consults with Austin Energy's Green Building program and several green architects, so we have been able to benefit from others' experience rather than guessing whether new techniques will work.

In addition to house design and site planning for maximum shade, all rooms have ceiling fans for delaying AC use until the hottest days. Large porches and windows are positioned for best use for the family and cooling the house. Trees planted on the east and west sides of the house provide shade in the morning and late afternoon.

Since most of our heat gain is through the roof, installing galvalume metal or using radiant barrier under light-colored composition shingles is our most important material choice. Our attics have continuous ridge and soffit vents. We also insulate above the ceiling to R-30. Next, we provide double-paned low-e windows with an SHGC of .29 and an R-value of .36. We use recycled cotton batt insulation in 24-inch o.c. 2-by-4 stud walls, and have no vapor barriers anywhere in the house.

As for durability, all homes have metal or 40-year shingles on the roof and Hardie siding. The rigid ductwork with R-10 insulation installed by our Sheet Metal Workers local union will last for the life of the home and is better-insulated than the R-6 flex duct systems we used previously. Yet with free labor, it costs the same. These measures, along with those listed on the linked spreadsheet [insert link], allow us to use a 1.5 ton central AC, the smallest size readily available, to cool 1,095 square feet.

In the first several years of our green building efforts, we concentrated on energy and water-efficiency and durability. In the past few years the emphasis has remained the same, but we have placed an increased emphasis on indoor air quality, safety, and our construction's downstream effects. We use low-VOC paints and floor adhesives or simply stain the concrete floors. Efforts to find reasonably-priced formaldehyde-free products such as cotton batt insulation and solid wood cabinets have paid off. Still, our homes are built so tightly that we install a simple mechanical fresh air ventilation system. Each home also has an integral loop fire sprinkler system.

In order to reduce landfill waste and our expenses, we build all walls in our warehouse and haul them to the site. We also recycle as much metal as we can and use as few non-recyclables, such as vinyl, as is currently practical. Dealing with the upstream issues of our materials and systems choices has been challenging, as the results seem farther away from our daily work. Still, we have tried to reduce our use of petrochemical products, including vinyls and plastics, because of the documented safety hazards to workers in some industries and the need to reduce the nation's reliance on petroleum.

Building green has increased the exposure of our affiliate in the community as well. Television coverage has been excellent, and we receive hundreds of visitors when we showcase homes on the Austin Cool House Tour. In this way we improve the public's view of our mission and accomplishments and demonstrate that environmentally friendly building is now possible for everyone.

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COURTESY OF AUSTIN HFH